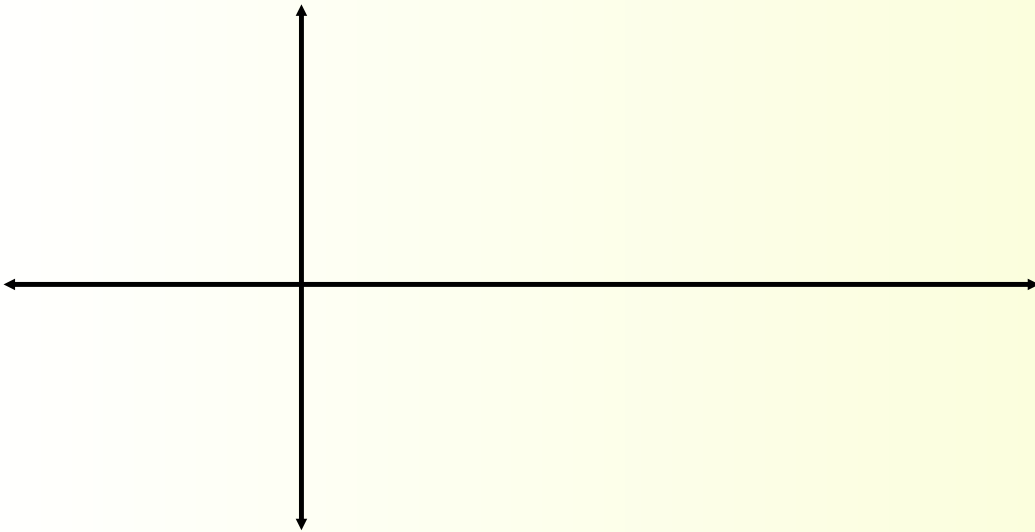


**Alg. 2 Warm Up #12-2**

1. Describe the transformations of  $y = \sin x$  that give us  $y = -4 \sin(2x) + 1$ , then graph one cycle.

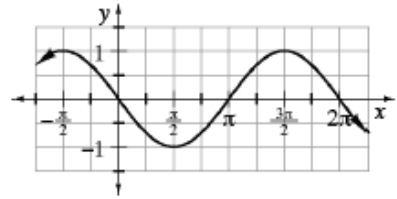
Label the line of oscillation.



## HW Questions:

Preview

- 7-158. Susan knew how to shift  $y = \sin x$  to get the graph at right, but she wondered if it would be possible to get the same graph by shifting  $y = \cos x$ .



- Is it possible to write a cosine function for this graph?  $y = \cos(x + \frac{\pi}{2})$
- If you think it is possible, find an equation that does it. If you think it is impossible, explain why.
- Adlai said, "I can get that graph without shifting to the right or left." What equation did he write?  $y = -\sin x$

- 7-159. In the function  $y = 4 \sin(6x)$ , how many cycles of sine are there from 0 to  $2\pi$ ?  $6$   
How long is each cycle (i.e., what is the period)?  $\frac{2\pi}{6} = \frac{\pi}{3}$

- 7-160. Write the equation of a cyclic function that has an amplitude of 7 and a period of  $8\pi$ . Sketch its graph.

$$y = 7 \sin bx$$

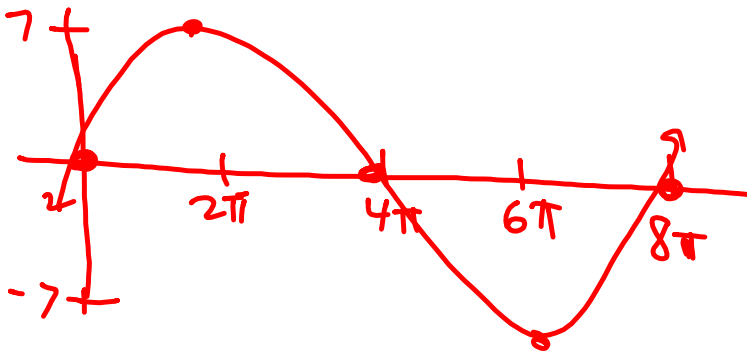
$$\text{Per} = \frac{2\pi}{b}$$

$$\frac{8\pi}{1} = \frac{2\pi}{b}$$

$$\frac{8\pi(b)}{8\pi} = \frac{2\pi}{8\pi}$$

$$b = \frac{1}{4}$$

$$y = 7 \sin \frac{1}{4} x$$



7-161. Recall the strategies you developed for converting degrees to radians. How could you reverse that? Convert each of the following angle measures. Be sure to show all of your work.

use:  $\frac{180^\circ}{\pi}$  or  $\frac{\pi}{180^\circ}$

a.  $\pi$  radians to degrees

b.  $3\pi$  radians to degrees

c. 30 degrees to radians

d.  $\frac{\pi}{4}$  radians to degrees

e. 225 degrees to radians

f.  $\frac{3\pi}{2}$  radians to degrees

$\frac{5\pi}{4}$

$\frac{225^\circ}{1} \cdot \frac{\pi}{180^\circ}$

7-162. Find the exact value for each of the following trig expressions. For parts (g) and (h), assume that  $0 \leq \theta \leq 2\pi$ .

a.  $\cos\left(\frac{3\pi}{4}\right) =$

$\leftarrow$  x coordinate on unit circle.

b.  $\tan\left(\frac{4\pi}{3}\right) =$

c.  $\sin\left(\frac{11\pi}{6}\right) =$

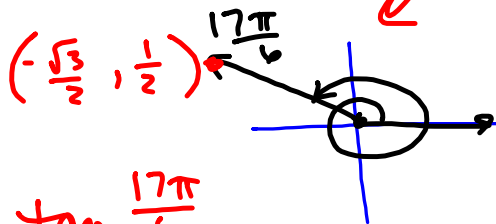
d.  $\sin\left(\frac{3\pi}{4}\right) =$

e.  $\tan\left(\frac{5\pi}{4}\right) =$

f.  $\tan\left(\frac{17\pi}{6}\right) =$

g.  $\tan(\theta) = 1$

h.  $\tan(\theta) = -1$



Where is  $\frac{\sin \theta}{\cos \theta} = 1$

$\theta = \frac{3\pi}{4}, \frac{7\pi}{4}$

$\tan \frac{17\pi}{6}$   
 $= \tan \frac{5\pi}{6}$   
 $= \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} \rightarrow -\frac{\sqrt{3}}{3}$

7-163. Solve this system of equations:  $5x - 4y - 6z = -19$

$$\textcircled{2} \quad -2x + 2y + z = 5$$

$$\textcircled{3} \quad 3x - 6y - 5z = -16$$

$$\begin{array}{r} 2\textcircled{2} + \textcircled{1} \quad -4x + 4y + 2z = 10 \\ 5x - 4y - 6z = -19 \\ \hline x - 4z = -9 \end{array}$$

$$\begin{array}{r} 3\textcircled{2} + \textcircled{3} \rightarrow -6x + 6y + 3z = 15 \\ 3x - 6y - 5z = -16 \\ \hline -3x - 2z = -1 \end{array}$$

7-163. Solve this system of equations:  $5x - 4y - 6z = -19$

$$-2x + 2y + z = 5$$

$$3x - 6y - 5z = -16$$

2<sup>nd</sup> Matrix

$$3 \times 4 \begin{bmatrix} 5 & -4 & -6 & -19 \\ -2 & 2 & 1 & 5 \\ 3 & -6 & -5 & -16 \end{bmatrix} \quad \left(-1, \frac{1}{2}, 2\right)$$

2<sup>nd</sup> Matrix  $\Rightarrow$  matrix rref

7-164. Use the Zero Product Property to solve each equation in parts (a) and (b) below.

a.  $x(2x+1)(3x-5)=0$

(b)  $(x-3)(x-2)=12$

c. Write an equation and show how you can use the Zero Product Property to solve it.

$$x^2 - 5x + 6 = 12$$

$$-12 \quad -12$$

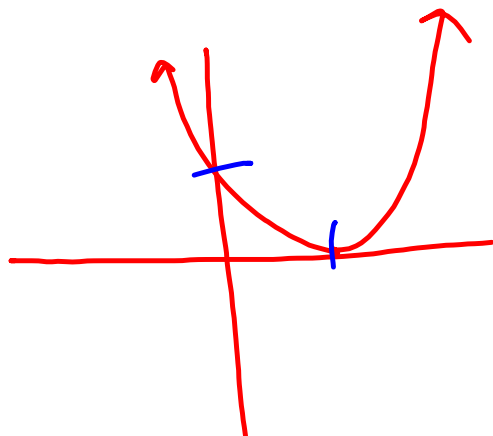
$$x^2 - 5x - 6 = 0$$

$$(x-6)(x+1)=0$$

$$x=6, -1$$

7-165. Find a quadratic equation whose graph has each of the following characteristics:

- a. No  $x$ -intercepts and a negative  $y$ -intercept.
- b.** One  $x$ -intercept and a positive  $y$ -intercept.
- c. Two  $x$ -intercepts and a negative  $y$ -intercept.



7-166. A two-bedroom house in Seattle was worth \$400,000 in 2005. If it appreciates at a rate of 3.5% each year:

a. How much will it be worth in 2015?

b. When will it be worth \$800,000?

$x = y$  since 2005

$100\% + 3.5\%$   
 $103.5\%$

$x = 10$   
 plug it in

Multiplier = 1.035

$$y = 400,000(1.035)^x$$



7-166. A two-bedroom house in Seattle was worth \$400,000 in 2005. If it appreciates at a rate of 3.5% each year:

- a. How much will it be worth in 2015?
- b. When will it be worth \$800,000?
- c. In Jacksonville, houses are depreciating at 2% per year. If a house is worth \$200,000 now, how much value will it have lost in 10 years?

$$\rightarrow 100\% - 2\% = 98\%$$

$$y = 200,000 (0.98)^x$$

## Group Quiz:

Calculators and notes are ok.

You may only write on your own paper.

Work together and check each other's work. Resolve any disagreements.

If you don't agree with your group, you may ask for your paper to be graded separately. Otherwise only one paper will be graded for your group.

HW: 7-

#168 ---> 175

Unit Circle Quiz: Thursday  
Test 7: Friday